Spot Safety Project Evaluation

Project Log # 200501258

Spot Safety Project # 01-97-010

Spot Safety Project Evaluation of the Vehicle Entering When Flashing Traffic Signal Installation at the Intersection of US 158 and SR 1131 (Poplar Branch Road) in Currituck Co.

Documents Prepared By:

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_____ 09-27-2005

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Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 01-97-010 – The Intersection of US 158 and SR 1131 (Poplar Branch Road) in Currituck Co.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis of the treatment versus comparison data has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a vehicle entering when flashing traffic signal. US 158 is a four-lane divided facility with center turn lanes at the intersection of SR 1131 (Poplar Branch Road). SR 1131 (Poplar Branch Road) is a two-lane facility with no left-turn lanes. US 158 has a speed limit of 45 mph and SR 1131 has a 35 mph speed limit at this intersection. The intersection was controlled by stop signs on SR 1131 in the before period. There was a previous study for this intersection completed from November 1, 1994 – October 31, 1997. The study yielded the following results: 8 total crashes, 4 frontal impact collisions, 1 class A, 1 class B, and 5 class C injuries. The final completion date for the vehicle entering when flashing traffic signal installation at the subject intersection was on March 15, 2000.

Comparison Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from February 2000 through April 2000. The before period consisted of reported crashes from December 1, 1995 through January 31, 2000 (4 Years, 2 Months). The after period consisted of reported crashes from May 1, 2000 through June 30, 2004 (4 Years, 2 Months), due to a traffic signal installation in the 3rd quarter of 2004. The ending date for this analysis was determined by the last crash report in the after period indicating a flashing signal as a traffic control device along with a police report acknowledging activation of a traffic signal. The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of all crashes within 150 feet at the signalized intersections of US 158 at NC 168 and US 158 at SR 1186. The

following data table depicts the Naive Before and After Analysis for the previous information. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. These crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	9	8	-11.1
Total Severity Index	36.3	3.8	-89.6
Frontal Impact Crashes	5	5	0.0
Frontal Severity Index	46.5	4.0	-91.5
Volume	13300	18600	39.8

Comparison Information

	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	37	37	0.0
Total Severity Index	8.3	4.4	-47.0
Frontal Impact Crashes	21	16	-23.8
Frontal Severity Index	11.4	3.8	-66.9
Volume	14200	18400	29.6

Odds Ratio: Treatment versus Comparison

	Before	After	Percent Reduction (-) Percent Increase (+)
Treatment Total Crashes	9	8	**-11.1**
Comparison Total Crashes	37	37	
Treatment F.I. Crashes	5	5	**31.3**
Comparison F.I. Crashes	21	16	

The naive before and after analysis at the treatment location resulted in an 11.1 percent decrease in Total Crashes, a 0.0 percent change in Frontal Impact Crashes, and a 39.8 percent increase in Average Daily Traffic (ADT). The comparison locations resulted in a 0.0 percent change in Total Crashes, a 23.8 percent decrease in Frontal Impact Crashes, and a 29.6 percent increase in ADT. The before period ADT year was 1998 and the after period ADT year was 2002.

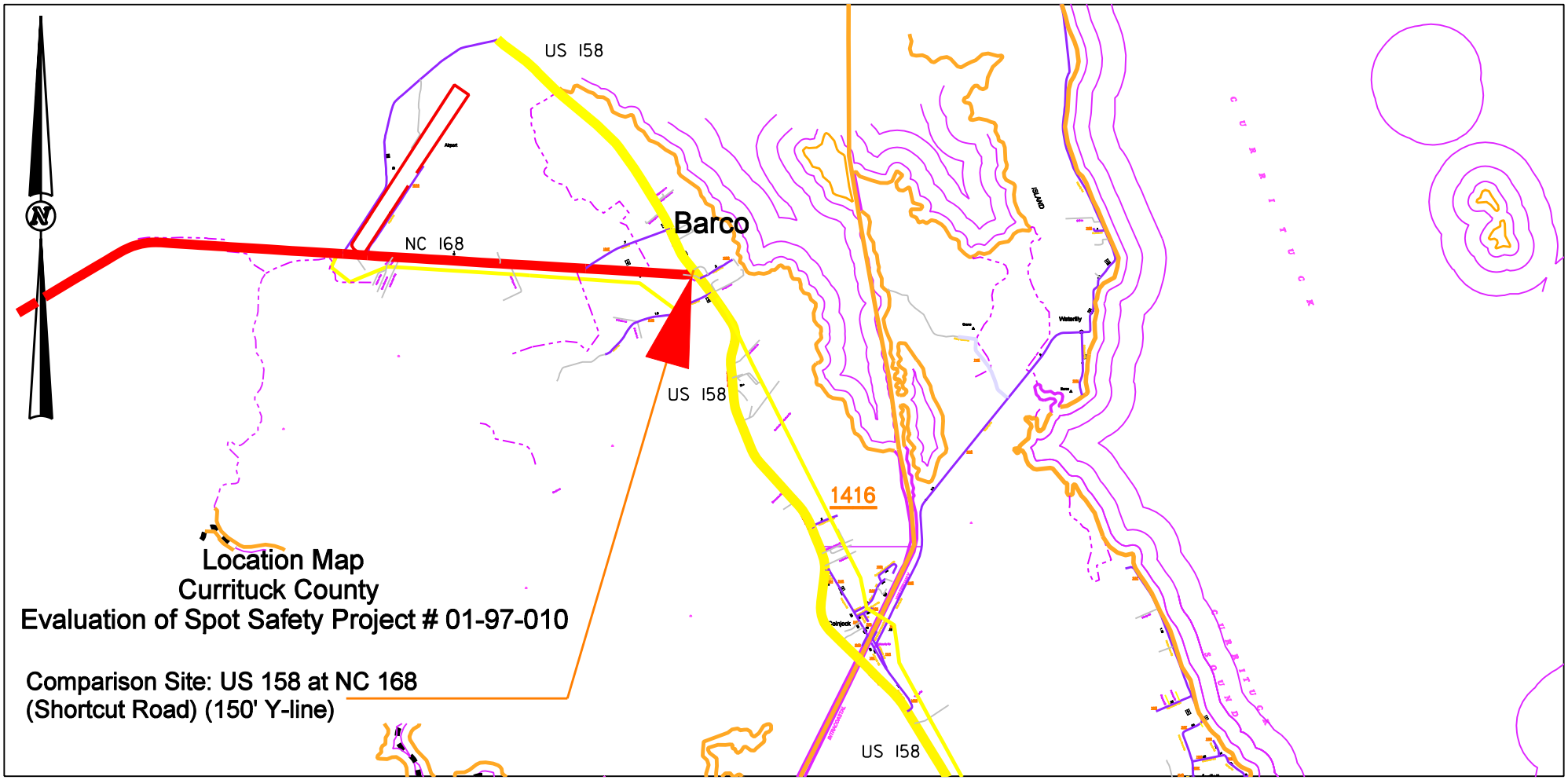
The Odds Ratio is used as another means of calculating the treatment effect. The total crashes in the before and after period from the Comparison Intersection are used to calculate the percent reduction in total crashes for the Treatment Intersection. As shown in the table above, using the Odds Ratio calculation, there is an 11.1 percent decrease in Treatment Intersection crashes and a 31.1 percent increase in Frontal Impact crashes.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an 11.1 percent decrease in Total Crashes and a 0.0 percent change in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in an 11.1 percent change in Total Crashes at the Treatment Intersection and a 31.3 percent increase in Frontal Impact crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and an increase in the number of Frontal Impact Crashes from the before to the after period.

Referencing the table in this report, there doesn't seem to be a significant reduction in total or frontal impact crashes. However there is a significant decrease in total and frontal severity of the crashes from the before to the after period. There were 3 crashes in the before period that a vehicle traveled across the centerline or off the road due to excessive speed in the curve on US 158. There were no such crashes in the after period. Reading through the crash reports showed a decrease in estimated speeds when traveling and at impact, which may be due to the flasher enhancing the visibility of the intersection.

The countermeasure crash reduction for Total Crashes at the subject intersection can be an approximate 11.1 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection can be in the range of a 0.0 percent change to a 31.3 percent increase in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.



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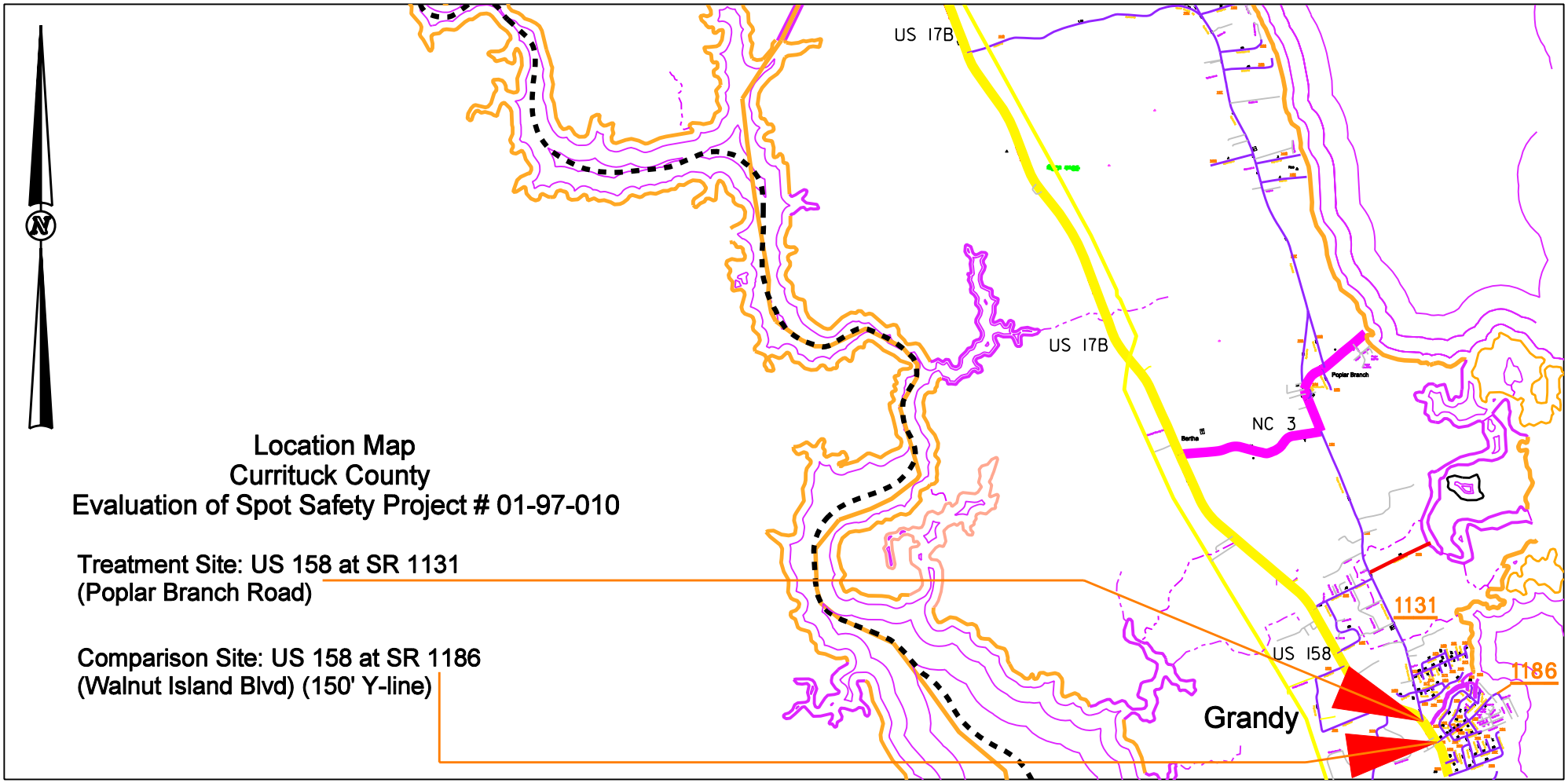

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Treatment Site Photos August 20, 2005

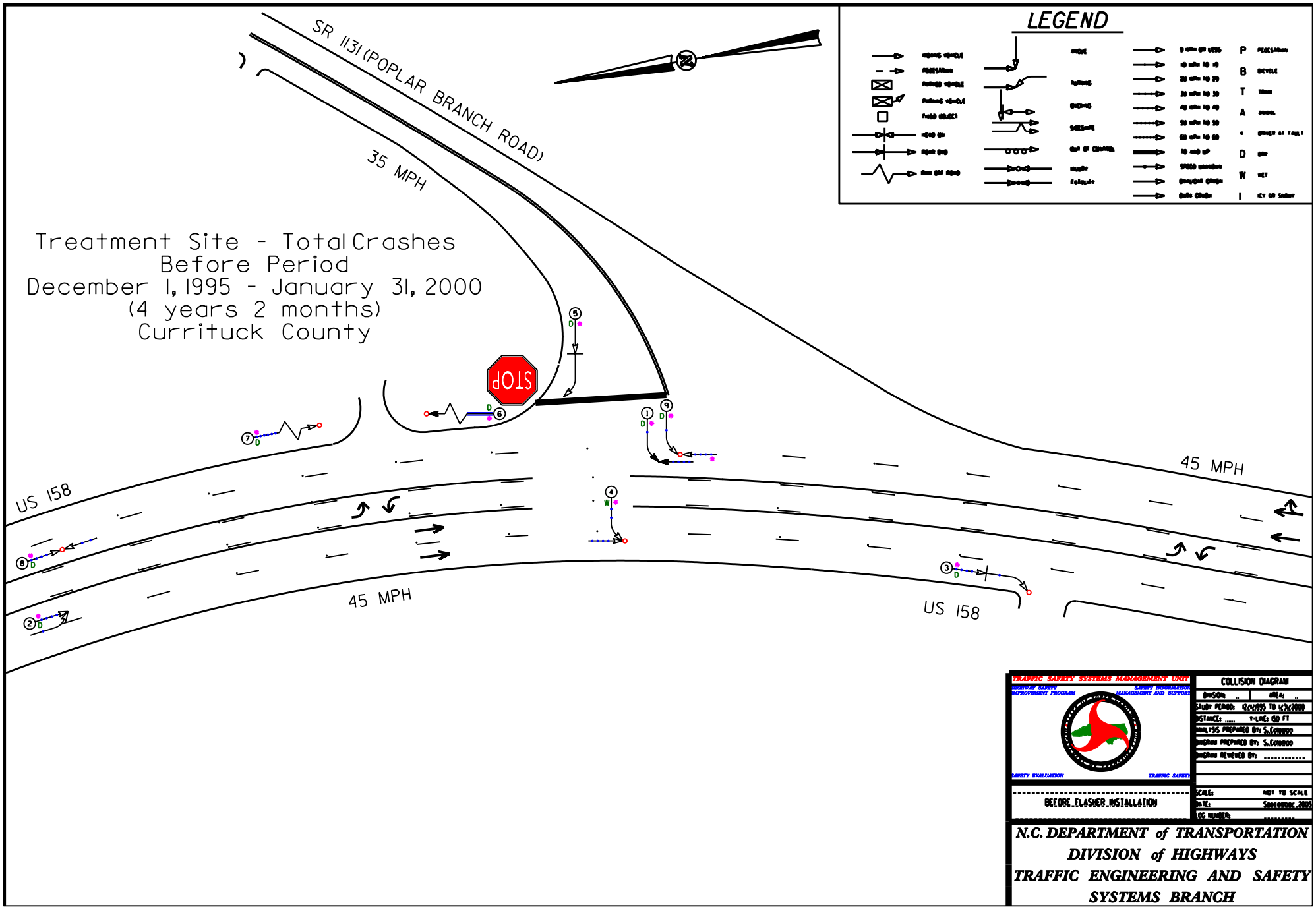
Looking west toward SR 1131 from Sonic entrance

Sonic driveway looking north on US 158

Driving north on US 158 toward SR 1131

On SR 1131 looking north

On SR 1131 looking south



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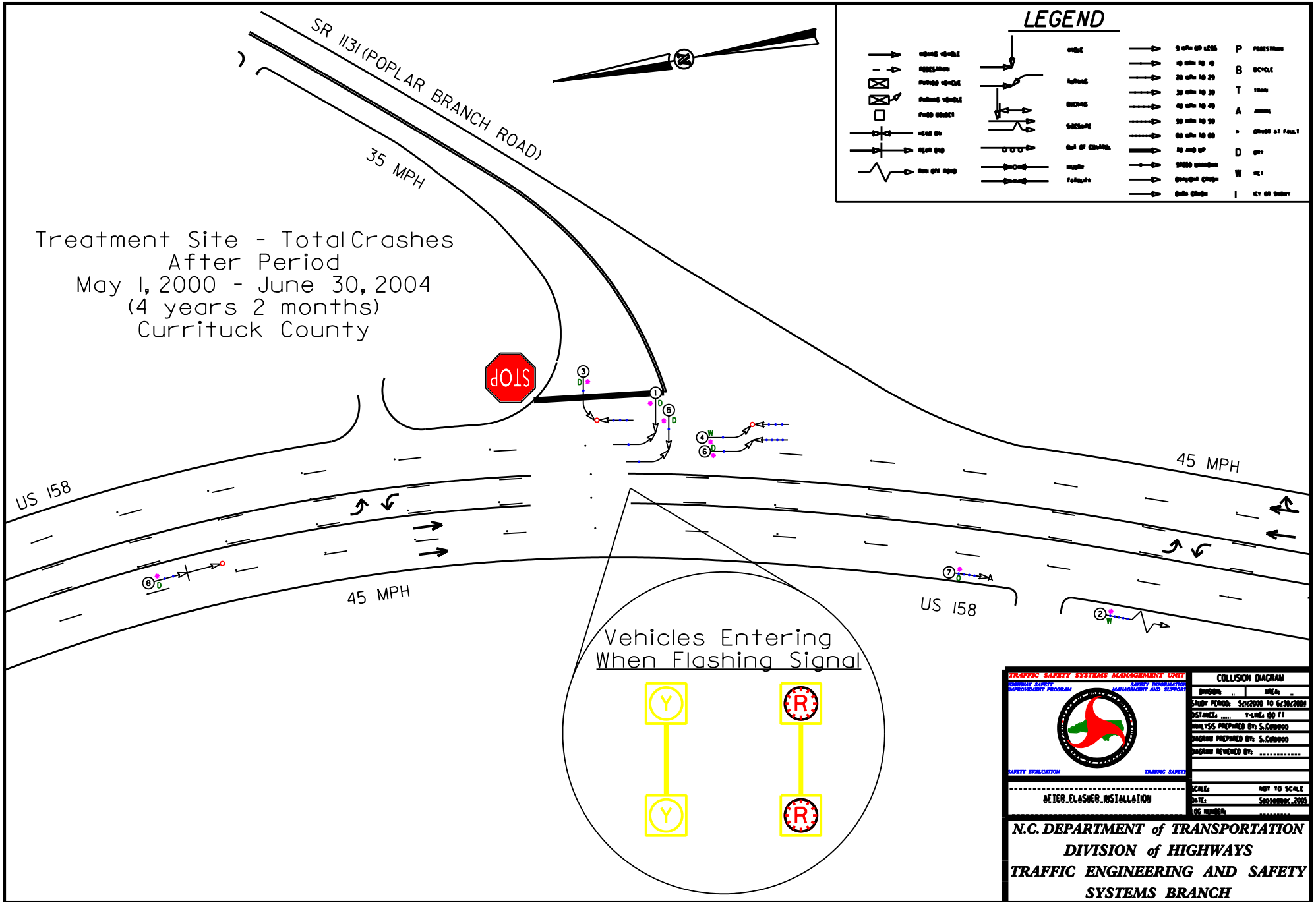

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